



Spatial distribution of rippled scour depressions and benthic communities

Preliminary results from Yankee Pt.

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Introduction

- Rippled scour depressions (RSD) are an abundant soft bottom habitat along the inner continental shelf from southern California (Phillips 2007) to Pt. Arena (Cacchione 1984).
- If RSDs are ecologically important soft bottom habitats these features should be incorporated into the design and evaluation of spatially based approaches to marine resource management (i.e. MBNMS, MLPA).

RSDs abundant along continental shelf

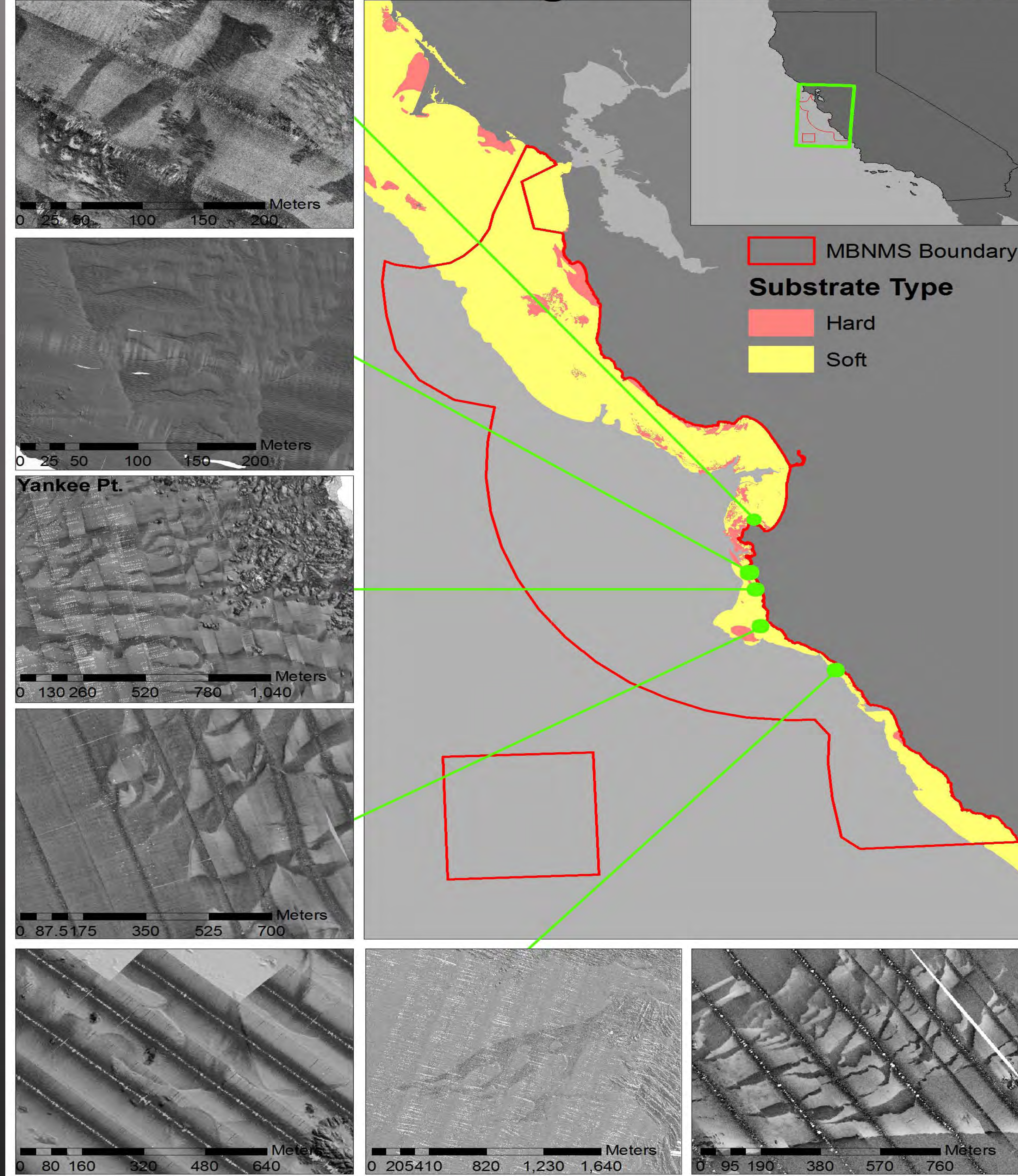


Figure 1: Sidescan maps of seafloor convey extent and composition of RSDs in MBNMS. Light colors reflect finer sand and dark colors reflect coarser sand. Data was collected using Reson 8101 and 7125 multibeam SONAR systems.

Methods

- RSDs identified in sidescan data and sediment taken inside and outside RSDs.
- ROV used to run video transects inside and outside of RSDs and across RSD boundaries.
- Benthic biota recorded to determine species richness and density inside and outside RSDs.

Results

- Sediment grain size and dominant benthiform differ inside and outside of RSD.
- Clustering of benthic biota outside RSD boundary, no clustering inside RSDs.
- Density of benthic biota was significantly greater outside of RSDs ($p=.004$).
- Poor video quality made measure of species richness difficult.

Table 1: Summary of area surveyed, abundance of organisms counted, mean density of organisms with standard deviation inside and outside of RSDs.

RSD	Area (m ²)	Abundance	Mean Density
Inside (n=6)	475.62	9	0.02 ± .03
Outside (n=4)	576.8	96	0.17 ± .07**

Discussion

- Preliminary results suggest that RSDs are ecologically poor habitats that do not support a diverse or dense benthic fish assemblage.
- Resource agencies should incorporate these features into the design and evaluation of spatial approaches to ecosystem management (i.e. MPAs).
- Size and extent of RSDs may increase with increasing storm intensity providing implications for effects of climate change.
- Future work will investigate other RSDs and attempt to relate landscape characteristics (depth, substrate, RSD size, distance from RSD) to species richness and density of benthic communities.

Literature Cited

*Cacchione D. 1984. Rippled scour depression on the inner continental shelf off central California. J of Sed. Petrology. 54 (4): 1280-1291.

*Phillips E. 2007. Exploring rippled scour depression off Huntington Beach, CA. Masters Thesis. UCSC.

Acknowledgements

Funding provided by SFML, Marine Technological Society, The International Women's Fishing Association, and Friends of Moss Landing Marine Labs.



Purpose

- Test the hypothesis that species richness and density of benthic biota differ inside and outside RSDs.

RSDs dominated by coarse sediment and long period sand waves

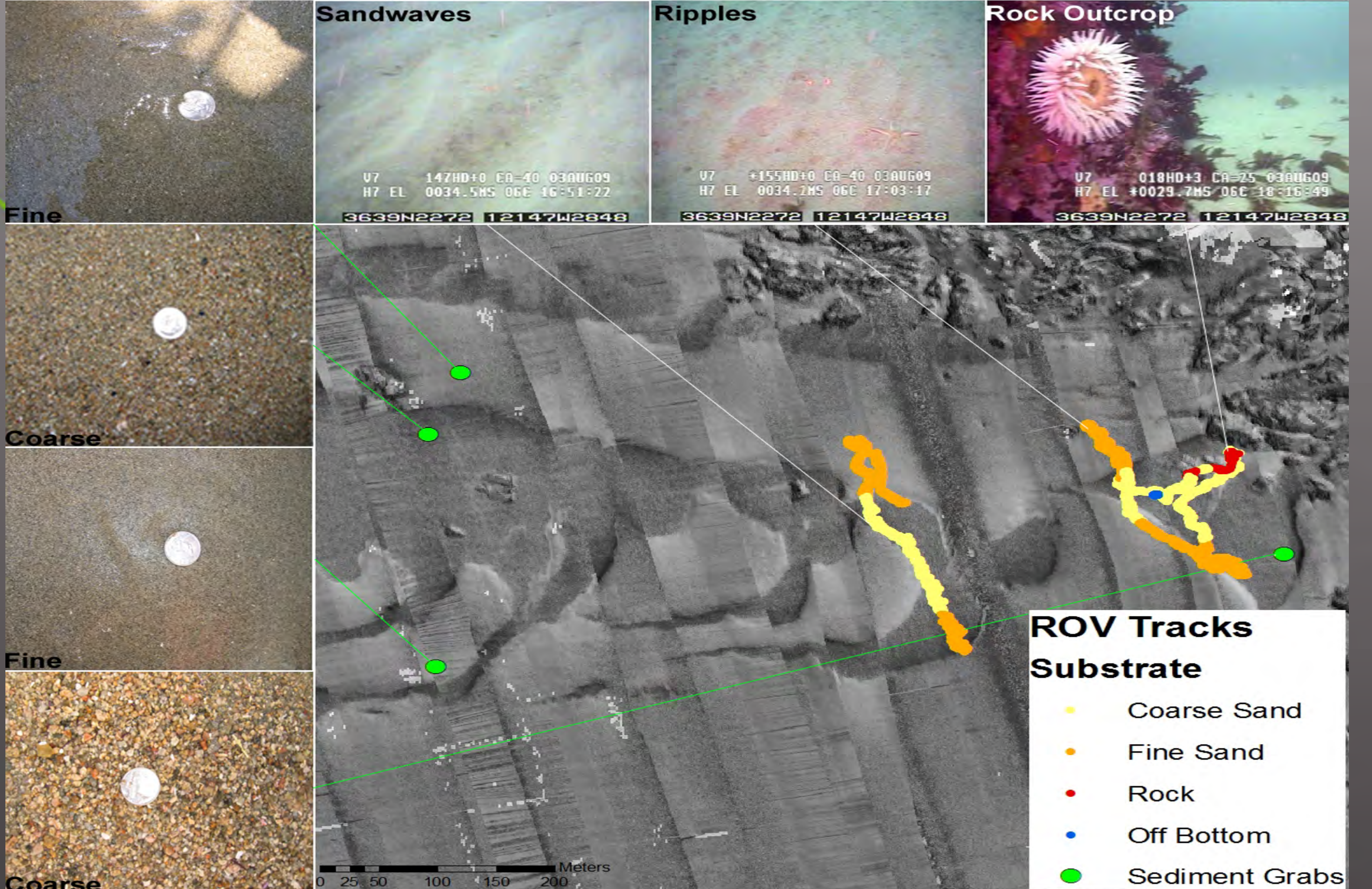


Figure 2: Locations of ROV transects and sediment grabs at Yankee Pt. conducted in August 2009. RSDs are characterized by 30-50cm depression, coarse grained sands (>.5mm), and long period sand waves (>.5m).

Hotspot analysis reveals clustering of benthic biota outside RSDs

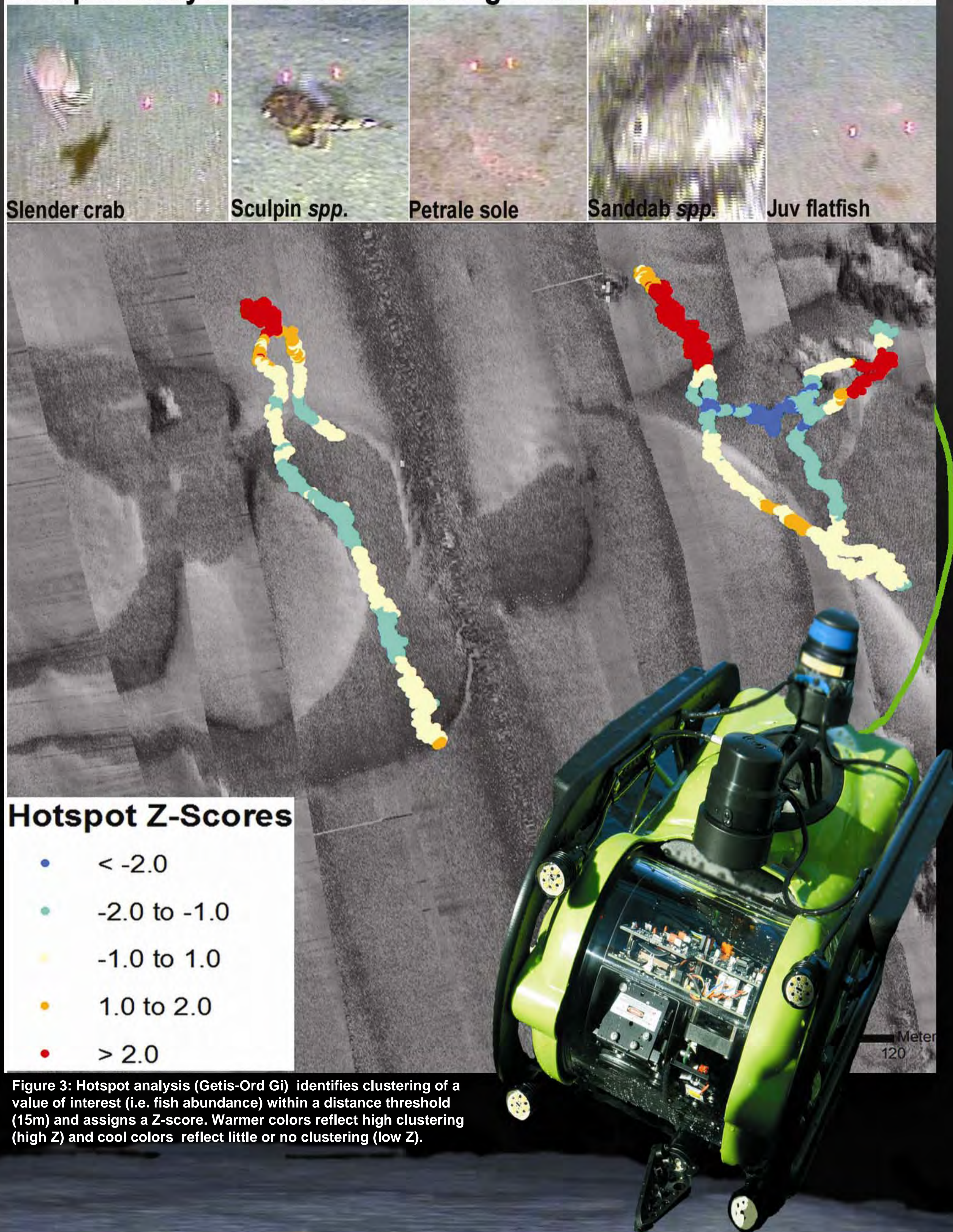


Figure 3: Hotspot analysis (Getis-Ord Gi*) identifies clustering of a value of interest (i.e. fish abundance) within a distance threshold (15m) and assigns a Z-score. Warmer colors reflect high clustering (high Z) and cool colors reflect little or no clustering (low Z).